Climate Change Risk Perception and Management:
A Survey of Risk Managers

April 2010

A Ceres Report

Ceres

Sponsored by Zurich

ZURICH

In association with PRMIA

PRMIA
The Professional Risk Managers' International Association

This Ceres report was authored by Nicole St. Clair Knobloch and Sharlene Leurig.

Ceres is a national coalition of investors, environmental groups and other public interest organizations working with companies to address sustainability challenges such as global climate change. Ceres directs the Investor Network on Climate Risk, a group of more than 90 institutional investors and financial firms from the U.S. and Europe managing over $9 trillion in assets.

This report was made possible through financial support from Zurich Financial Services and with the cooperation of the Professional Risk Managers' International Association (PRMIA). The opinions expressed in this report are those of Ceres and do not necessarily reflect the views of the sponsor or associated organizations.

Ceres wishes to thank the members of the Ceres team who provided valuable insight and editing, including Connie Chung, Pat Daniel and Stephen Tripoli.

Patricia Robinson designed the final report.

Ceres
99 Chauncy Street
Boston, MA 02111
www.ceres.org

Table of Contents

Introduction

Over the past decade, the insurance industry has become increasingly concerned about climate risks to its corporate customers – from how a changing climate may affect physical assets and natural resources critical to operations, to regulatory costs as climate policies are enacted, to liability exposures stemming from damages associated with historical greenhouse gas emissions. These concerns have been articulated by global reinsurance companies in reports on topics as varied as hurricane loss trends[1] and the impact of pending court cases on tort liability payments[2], and by regulators, including the U.S. Securities and Exchange Commission and the National Association of Insurance Commissioners.

These concerns have also fueled a growing number of novel insurance products for green buildings, renewable energy installations and carbon capture and storage, as insurers seek to keep up with rising investments in renewable energy, energy efficiency and innovative technologies to manage carbon pollution.[3]

This report describes the results of a survey of corporate risk managers conducted by Zurich Financial Services, the Professional Risk Managers' International Association (PRMIA) and Ceres. The survey is a first step in assessing whether and to what extent risk managers are concerned about the risks posed by climate change regulation and/or by climate change itself, and how well the insurance industry is or is not serving risk managers to transfer or manage the risks in this arena. The questions the survey sought to answer included:

- **Are risk managers concerned about climate risks?**
- **What types of climate risks are they most concerned about – and does that vary by industry?**
- **Where is climate risk being managed within firms?**
- **Might risk managers be interested in particular insurance products that may help companies invest in new technologies or transfer risk to stay competitive in a changing market?**
- **Do risk managers believe their existing insurance coverage is adequate to manage climate liability risks?**

---

1 *Shaping Climate-Resilient Development: A Framework for Decision Making,* Economics of Climate Adaptation Working Group, 2009.

2 *Liability for Climate Change: Experts' views on a potential emerging risk,* Munich Re, 2010, see http://www.munichre.com/publications/302-05493_en.pdf.

3 A compendium of energy-related insurance products is provided in Evan Mills, *From Risk to Opportunity: Insurer Responses to Climate Change,* Ceres, 2008.

A Changing Business Environment

Whether from a science, policy, or economic perspective, rising concerns about fossil fuel energy and its effects on the Earth's climate have begun to reshape the environment in which businesses operate.

- Climate scientists have predicted – and in some cases are observing – effects of fossil fuel pollution buildup in the atmosphere and oceans[4]. These effects include changing precipitation patterns; more intensive droughts and fires; permafrost, sea ice and glacial melt; expansion of pest infestations; and other changes that can have an effect on a firm's physical assets, supply chain or business structure.

- Policymakers at all levels of government – global, national, state, and local – are acting to limit pollution and/or encourage the new energy economy, both of which can have material implications for carbon-intensive operations and fixed assets.

- Many corporations and capital providers are moving to a new energy economy in at least some aspect of their business strategy – by guarding against liability or damage, planning new fuel sources should regulation be enacted, or, in some cases, planning responses to changing consumer preference and regulation by developing new products.

A Changing Risk Environment

These changes to the business environment may be creating a new emerging risk environment, with several types of potential climate risk.

Regulatory Risk For some companies, the expectation of greenhouse gas regulation poses new costs and compliance obligations to manage. For others, regulation will not affect them directly, but a new market environment may emerge through increased fuel prices and/or changed consumer demand.

Physical Risk Climate change has already altered our environment in ways that are changing historical economic models. Examples include changing patterns of precipitation and drought that compromise freshwater availability and crop viability, melting permafrost threatening fuel pipelines, fewer freezing nights to kill off insect pests, and other trends that may disrupt supply chains, contribute to volatile commodity prices or pose unexpected capital costs.

In addition to such persistent or slow-moving trends, changing global and regional climates may cause some extreme events such as hurricanes, floods, and winter storms to occur more frequently or with greater intensity. Both private insurers and federal programs like the National Flood Insurance Program have begun to assess whether insurance rates should be adjusted to reflect apparent changes in the return periods of extreme events (i.e., the estimated interval of time between events of a certain size).

4 *Global Climate Change: Impacts in the United States,* U.S. Global Change Research Program, Washington, DC, 2009.

Competitive Risk A new set of regulatory expectations and/or a changing physical environment could lead to a new competitive environment, through increased fuel costs or an increase in competition for dwindling resources, such as water, leading to other increased costs.

Legal Risk Tort liability is emerging as a risk management concern for some firms, as individuals, corporations and governments faced with financial damages or non-recoverable expenditures seek to recover these costs from alleged contributors to climate change. Such liabilities may stem from recovery of costs due to stressed resources (e.g., water pollution in water-stressed areas), cost recovery related to the relocation of human settlement away from land reclaimed by rising seas[5], or damages from extreme events intensified by greenhouse gas emissions[6].

Reputational Risk Firms exposed to any of the above risks may suffer reputational risk if brand names are associated with climate-related damages or perceived mismanagement of the climate change risk environment.

5 See *Village of Kivalina v. ExxonMobil Corp.,* 08CV1138 (N.D. Cal. Feb. 2008).

6 See *Comer v. Murphy Oil USA, Inc.,* No. 1:05CV436 (S.D. Miss. 2006).

About the Survey

Why This Survey?

Major insurers are increasingly concerned that risk managers may not be aware of emerging liabilities, and may not be adequately covered for them. As insurers indemnify companies against losses ranging from property damage to performance failures to litigation, they have an interest in understanding their clients' level of awareness and identifying opportunities for education on these evolving risks.

By understanding risk managers' concerns and how clients anticipate risks, the insurance industry will be in a better position to adapt and develop products to provide more specific and comprehensive coverage against these losses.

Who Participated in the Survey?

In coordination with PRMIA, we surveyed risk managers from over thirty industries and from city and state governments. 5,585 risk managers belonging to PRMIA were sent an email invitation to take the web-administered survey, and 107 self-selected to take the survey over two weeks. Additionally Zurich sent the same survey invitation to 2,750 of their clients, and 95 responded over four days.

A total of 202 respondents (2.4% of the total invited) responded to at least part of the survey, with 136 respondents (67%) completing the entire survey. Respondents represented a range of industries, including agriculture, heavy emitting industries such as energy and power producers, manufacturing and mining, financial services, insurance, and other industries ranging from real estate to food manufacturing.

Multiple Answers

For most of the questions, respondents were allowed to select more than one answer, making percentages add up to more than 100%. For example, when identifying climate risk and its likelihood, respondents were asked to rate each risk rather than choose one.

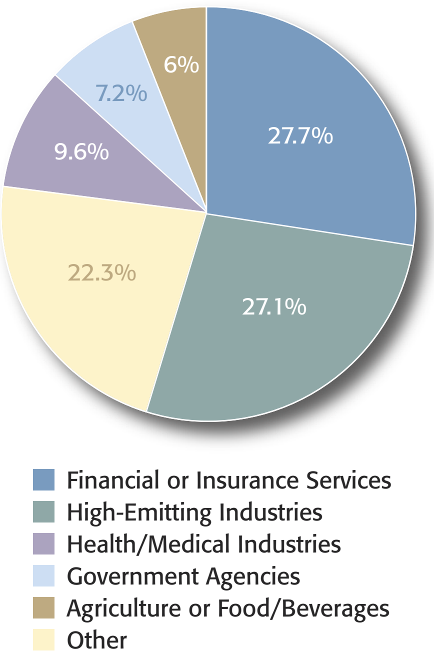
Industry Representation

When asked to identify industry sector, respondents could select any responses that related to their job, such as "electric power" and "utility" or "financial services" – again making total percentages add up to more than 100%.

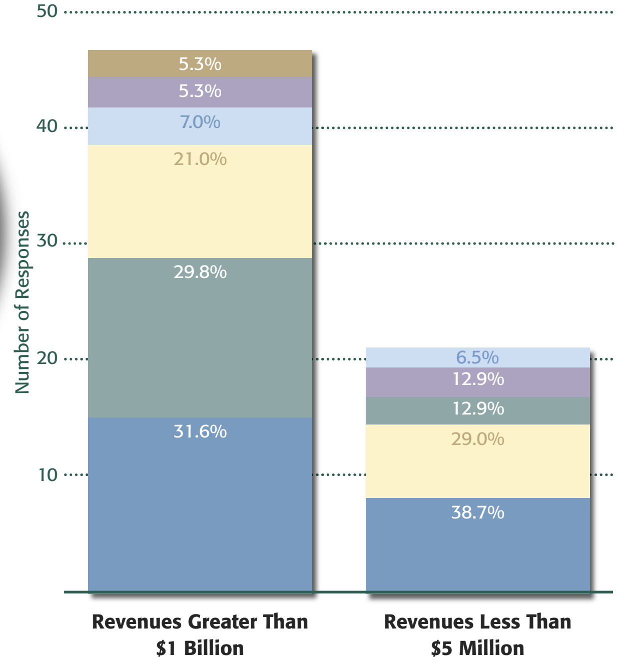
The majority of respondents who participated in the survey self-identified from industries whose trade publications or counsel are more likely to discuss regulatory risk, such as heavy emitters including electric power, oil and gas, manufacturing, cement, and mining (27.1%), and financial or insurance services (27.7%). The other largest segment represented was health/medical (9.6%). A portion of respondents self-identified from municipalities (7.2%), some of whom likely represented public power or water utilities. Agriculture, food, and beverages comprised the next largest portion (6.0%) of respondents.

Survey Respondents

Industries Represented



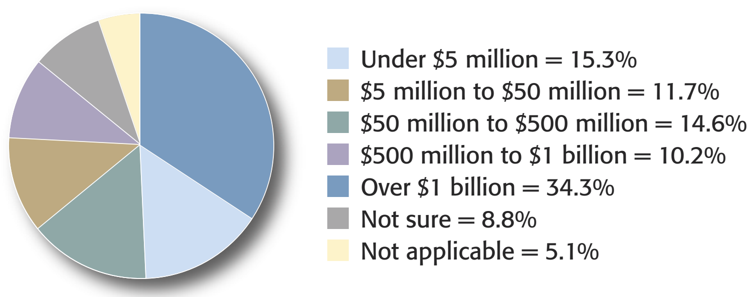
Industry Representation in Highest and Lowest Revenue Brackets



High-emitting industries included respondents who represented power, utility, oil, mining, industrial manufacturing, and consumer manufacturing.

Other respondents represented software solutions, real estate and construction, and waste management industries, among others. See Survey Details (page 30) for complete text of Question 12 of the survey instrument.

Surveyed Organizations 2009 Revenues, as Estimated by Respondents



The highest numbers of respondents from individual sectors were: financial services (39), health/medical (17), insurance (13), electric power (11), and oil and gas (9). In part the heavy weighting toward financial services reflects the preponderance of risk management professionals in this industry.

Of those indicating their firm's size and industry type:

- 47 respondents indicated revenues greater than $1 billion in 2009. Of these, 38.3% reported representing high-emitting industries manufacturing, mining, power, oil, or utilities and 38.3% reported insurance or financial services.
- 21 respondents indicated revenues less than $5 million in 2009. Of these responses, 57.1% represented financial services or insurance, 23.8% represented health/medical, and 14.3% represented heavy emitting industries.

Potential Survey Bias

There were two primary sources of potential survey bias in survey results:

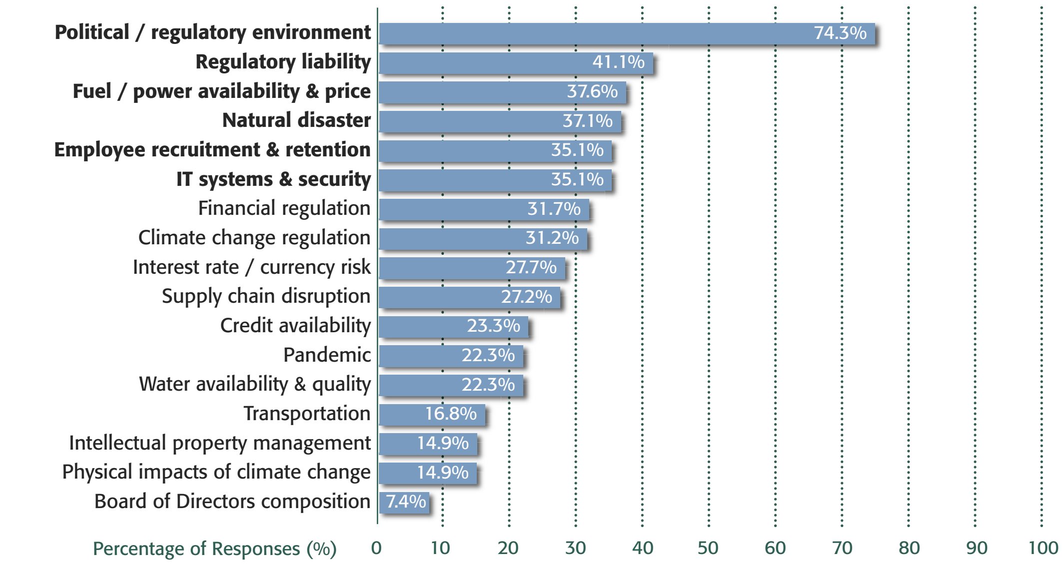
1] Respondents who chose to participate in the survey may be those individuals with the greatest personal interest in climate change (though this might be expressed either as strong tendency to believe in climate change causes/effects or as a strong tendency to be critical of climate change causes/effects), and

2] Zurich clients may have been more likely to perceive certain climate risks or to express interest in novel climate-related insurance products due to prior education/outreach by Zurich.

Risk Concerns

Top Risk Management Concerns

Of the following issues that may pose business risks to your company, please indicate the five (5) risks that you are most concerned about. (Percent of Responses)



The risk receiving far and away the most responses, "political/regulatory environment," was rated among the top five concerns by 74.3% of respondents.

Top Risk Concerns (Q1)

Respondents were asked for their top risk management concerns, which included but were not limited to climate risks. The list of potential answers included current – and more publicized – risk management concerns such as board of directors' composition, credit availability, and financial regulation. *(Respondents asked to select five.)*

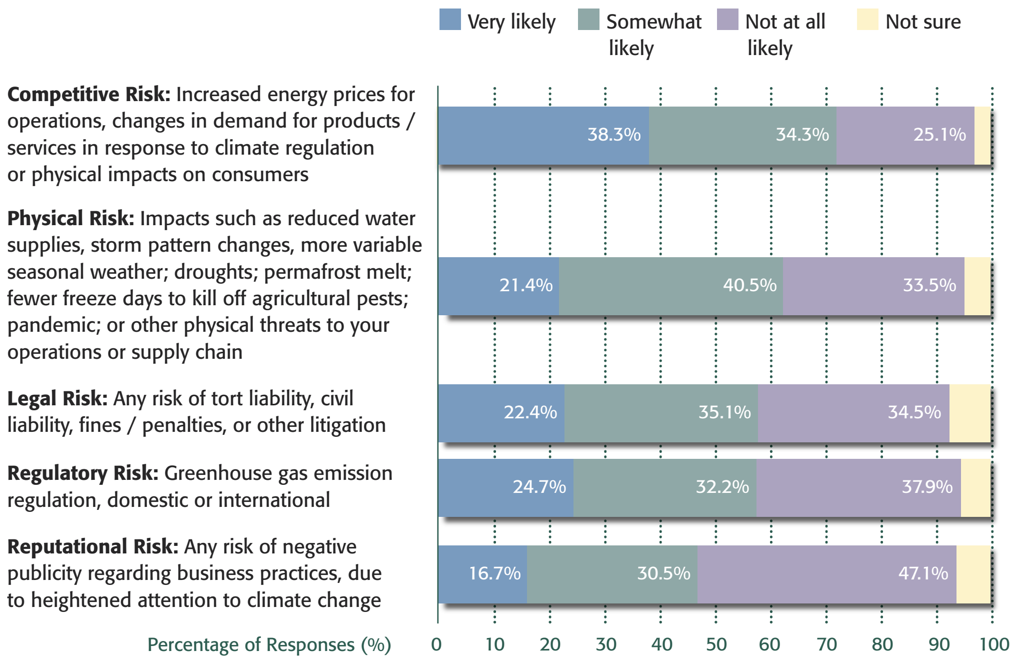
The risk receiving far and away the most responses, "political /regulatory environment," was rated among the top five concerns by 74.3% of respondents. This was followed by "regulatory liability" (41.1%), "fuel power availability and price" (37.6%), "natural disaster" (37.1%), and "IT systems and security" (35.1%).

"Climate regulation" came in seventh, with nearly a third of respondents (31.2%) rating it as a top concern.

Likelihood of Climate Risk, By Type (Q2)

Strong majorities considered regulatory, physical, competitive, and legal climate risks to be "very" or "somewhat" likely, with responses to these risks just above or below 60%.

Perceived Likelihood of Organization's Exposure to Climate Risk, By Type



Respondents were asked about the likelihood of their firm being affected by any of the five identified categories of climate risk: regulatory, physical, competitive, legal, and reputational. *(Respondents asked to respond to each risk.)*

Strong majorities considered regulatory, physical, competitive, and legal climate risks to be "very" or "somewhat" likely, with responses to these risks just above or below 60%. (56.9% regulatory risk; 61.9% physical risk; 62.6% competitive risk; 57.5% legal risk). Of these, from 21.4% (physical risks) to 38.3% (competitive risks) identified the risk as being "very" likely.

Responses were lower, however, for "reputational risk." While 47.2% identified this risk as "very" or "somewhat" likely, this risk received the highest number of "not at all" likely responses, with 47.1% asserting reputational risk would not pose a problem for the firm. Just 16.7% identified reputational risk as "very" likely to pose a problem for the firm.

A Closer Look

Perception of Risk by Industry Sector

Regulatory Risk and Competitive Risk

Regulatory risk was considered “very likely” by 24.7% (43) of respondents, with 31 respondents identifying their industry sector. Competitive risk was considered “very likely” by 38.3% (67) of respondents, with 49 identifying their industry sector. Of those considering regulatory risk “very likely” (31) who described their industry, all 31 indicated heavy emitting industry, in addition to indicating other industry, such as financial services (6). A similar mix was represented by those considering competitive risk a “very likely” concern.

Of those who answered regulatory climate risk was “not at all” likely to affect their company, most represented the financial services, insurance, health care industries, and government (municipal and state).

Physical Risk

Physical risks were considered “very” likely by 21.4% (37) of respondents, with 26 reporting their industry sector. Over half of those reporting their industry indicated they represented heavy emitting industry, while 38.5% reported financial services, 23.1% reported insurance, and 23.1% reported the health/medical fields.

Legal Risk

Legal risks were considered “very” likely by 22.4% (39), of respondents with 26 reporting their industry sector. Over half of those reporting their industry indicated they represented heavy emitting industry, while 38.5% reported financial services, 23.1% reported insurance, and 23.1% reported the health/medical fields.

Over a third of total respondents (34.5%) found legal risk “not at all” likely, with 10% of those respondents representing the oil and gas/refining industry, and 28% representing the financial services industry. The rest of the “not at all” likely responses were spread across most other sectors.

Reputational Risk

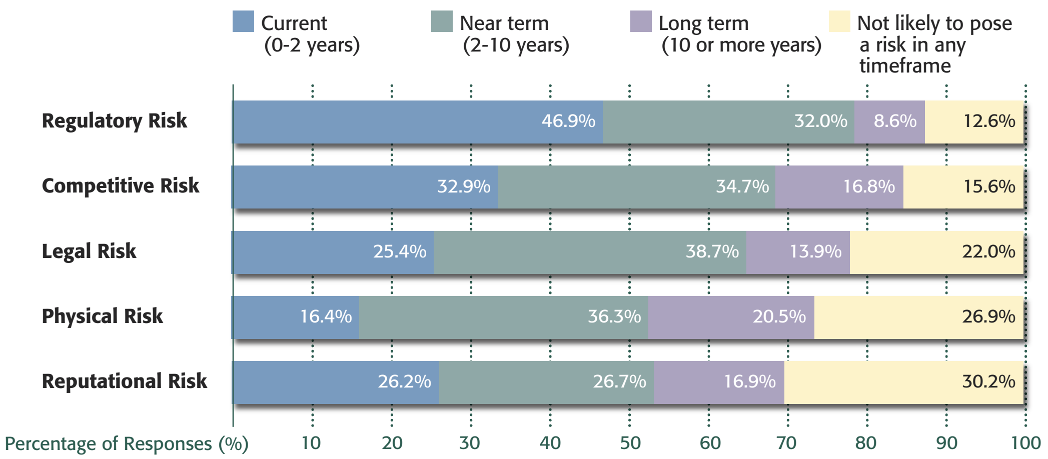
Just 16.7% (29) of respondents found reputational risk “very” likely – 16 of these respondents identified their industry, including agriculture, some heavy emitters like oil and gas, financial services, and, other sectors such as health/medical.

The largest number of respondents (82) indicated reputational risk was “not at all” likely to affect their company. Of the 66 reporting their industry sector, 21 reported financial services, while others were spread across emitting and non-emitting sectors.

Climate Risks Timeframe (Q3)

Respondents were asked about the timeframe within which they expected risks to manifest. *(Respondents asked to respond to each risk.)*

Timeframe for Expected Climate Risks



In general, the majority of those anticipating exposure to some form of climate risk expected that exposure to occur within the next ten years.

- **Regulatory risk** was considered most imminent, with 78.9% asserting the risk was current (to occur within 0-2 years) or near term (2-10 years). Regulatory risk showed the fewest responses to "not likely in any time frame," with just 12.6% answering that way.
- **Competitive risk** was second to regulatory risk in being expected over the current or near term, with 67.6% indicating that risk was likely within 0-2 or 2-10 years. 15.6% felt that competitive risk was "not likely in any time frame."
- **Physical risk** was least expected to present itself within the next two years (16.4%). A majority — 56.8% — assumed that physical risks would present themselves in the near (2-10 years) to long term (10 or more years), and represented a mix of heavy emitting industry, the health/medical sector, financial services, and insurance. More than a third felt that physical risks would present themselves in 2-10 years' time.
- **Legal risk** was perceived as likely to pose a risk in the next ten years but not as posing an imminent (0-2 year) risk. The highest perception of legal risk was in the near term (2-10 years) with 38.7%.
- **Reputational risk** was again of least concern, receiving the highest response – 30.2% – that it was "not likely to pose a risk in any timeframe."

Of those who listed "regulatory risk" as a top and imminent concern, 38.1% were from the "emitting" industries represented in the survey respondents (manufacturing, mining, power, and oil), and nearly 20 percent self-identified from the financial services or insurance industries.

Of the respondents who said regulatory climate risk was "not at all" likely to affect their company, a full third (33.3%) indicated that climate regulatory risks were currently relevant (0-2 year timeframe). This may reflect respondents' sense that federal climate legislation is likely to occur in that timeframe, even if it would not directly affect a respondent's own firm or industry.

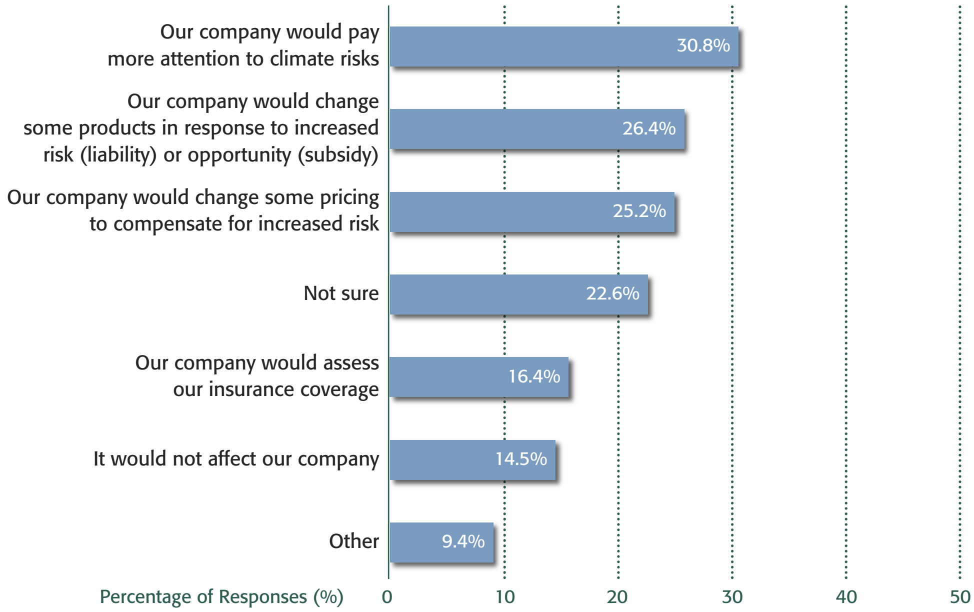
Of the respondents who said regulatory climate risk was "not at all" likely to affect their company, a full third (33.3%) indicated that climate regulatory risks were currently relevant (0-2 year timeframe). This may reflect respondents' sense that federal climate legislation is likely to occur in that timeframe, even if it would not directly affect a respondent's own firm or industry.

Response to Climate Regulation (Q4)

Respondents were asked how government action such as cap and trade legislation or new taxes or subsidies would affect risk management. They were asked to choose "any and all that apply" from the general statement "our company would pay more attention to climate risks" to specific actions such as assessing insurance coverage, changing pricing, and/or changing products, to "it would not affect our company."

Expected Response to Climate Change Regulation

If government takes action, such as implementation of cap and trade, taxes or subsidies (e.g., grants, loans, loan guarantees), to reduce greenhouse gas emissions, in what way would passage of such legislation or rulemaking most likely affect your risk management? (Percent of Responses)



Just 14.5 % of respondents said government action to address climate change would not affect their company. Over half of these respondents (8.2% of the total) reported representing heavy emitting industry.

Responses indicating possible action were fairly evenly divided among the choices, from generally "paying more attention" to climate risks (30.8%), changing some products to respond to risk or opportunity (26.4%), changing some pricing of their goods or services to compensate for increased costs (25.2%), and/or assessing insurance coverage (16.4%).

Slightly less than a quarter were "not sure" how their company would respond (22.6%).

Respondents were also invited to write in more specific responses by selecting "other" – 15 respondents did so. These responses ranged from negative comments (8), such as "Likely to shut down my facility" or "It would reduce demand for our services," to positive or neutral comments (5), such as "We are [a] biorefining consultancy, we look to take advantage of ghg [greenhouse gas] regulation," or "Might help our members pool carbon trading credits," to hostile comments (2), such as, "It would be one of the most idiotic, self-made disasters in recorded history."

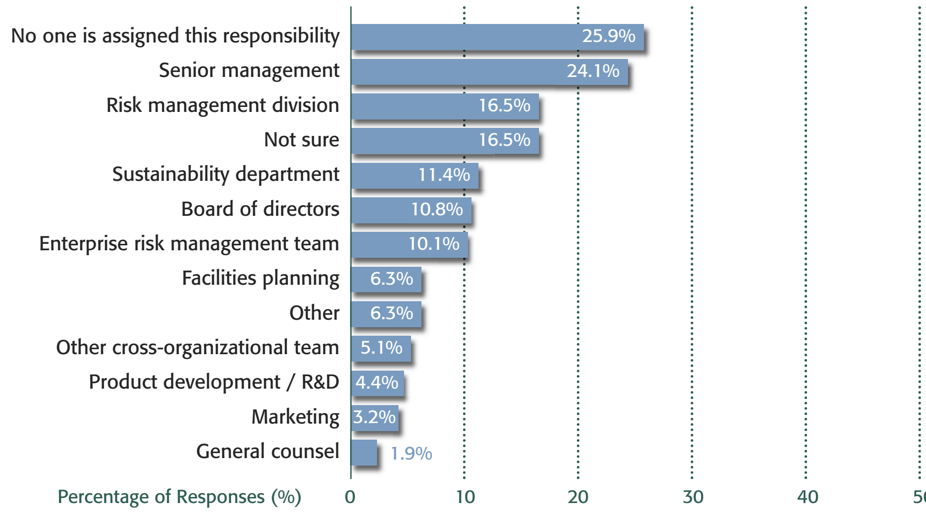
Responsibility for Climate Risk Management (Q5)

Respondents were asked whether their company had a process in place to assess the risks and opportunities associated with climate change, and to identify who within the organization is responsible for "interpreting, managing, or communicating climate change risks." *(Respondents asked to "select any and all that apply.")*

Responsibility for Climate Risk Management

Does your company have a process in place to assess these risks and opportunities associated with climate change? If so, please indicate who within the organization is responsible for interpreting, managing or communicating climate change risk. (Percent of Responses)

Just over a quarter of respondents, 25.9%, responded that "no one is assigned responsibility." Among those who did indicate climate risk responsibility assigned within the firm, 24.1% indicated "senior management" was responsible for monitoring climate risk.



Just over a quarter of respondents, 25.9%, responded that "no one is assigned responsibility." More than one third (36.7%) of those respondents who had said regulatory climate risk was "not at all likely" to affect their company also indicated that no one in the company had been assigned to assess the risks and opportunities of climate change.

Among those who did indicate climate risk responsibility assigned within the firm:

- The highest response, 24.1% indicated "senior management" was responsible for monitoring climate risk, and these responses largely came from respondents from heavy emitting industry, health/medical, engineering, and financial services.
- The next highest response indicated the risk management division (16.5%).
- Around 10% of respondents described such responsibility as falling to "board of directors," "sustainability department," and "enterprise risk management team."

Of ten write-in responses in the "other" category, 60% described responsibility as falling to an environmental or energy department.

Risk Perception and Responsibility for Risk Management

A Closer Look

We examined the relationship between the climate risk management responsibility and the perception of various climate risks.

Regulatory Risk

Of those who found regulatory risk "very likely":

- Nearly 100% thought it was possible in the next two years or 2-10 years
- Those respondents were likely to indicate the sustainability or environmental department (33.3%), senior management (27.8%), or a cross-organizational team (11.1%) as having responsibility for managing that risk
- Just 13.9% (5) indicated no one is assigned responsibility for managing climate risk and 11.1% indicated they were not sure who was assigned this responsibility.

Competitive Risk

Of those who found competitive risk "very likely":

- Nearly one quarter (14 respondents) indicated that no one in their firm is currently assigned responsibility to assess climate risks and opportunities.
- Twelve of those respondents answered the industry sector section – eight reported representing heavy emitters, while other responses were spread among financial services and other corporate sectors and functions.

Physical Risk

Of those who found physical risk "very likely":

- Slightly less than a quarter said that senior management (21.2%) and risk management division (21.2%) were responsible for managing the risk.
- 15.2% (5) said no one is assigned this responsibility – representing electric power, municipal government, financial services, insurance, and corporate non-financial.

Legal Risk

- Five respondents indicated legal risks were "very likely," and all five reported "no one is assigned this responsibility."
- These respondents reported representing the heavy emitting sectors electric power, oil and gas, and chemical and auto manufacturing, and indicated that at least some of those represented government entities such as public works.

Reputational Risk

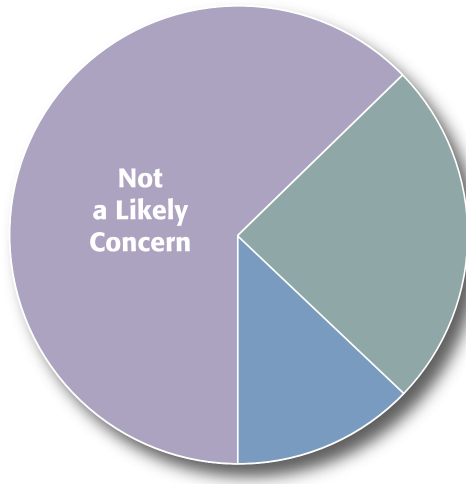
- Four respondents indicated reputational risks were "very likely," and all four reported "no one is assigned this responsibility."
- These respondents reported representing the heavy emitting sectors electric power, oil and gas, and chemical and auto manufacturing, and indicated that at least some of them were from government entities, such as public works or power.

Concern About and Management of Legal Risk (Q10)

Respondents were asked whether they expected to be at risk for any potential litigation over climate change, and how they managed that risk. *(Respondents asked to select one.)*

Concern About Climate Change Litigation

- 62.1% Climate change litigation is not a likely concern for our company.
- 24.2% We retain and manage this liability risk
- 13.6% We attempt to spread this risk among our insurance providers



A majority (62.1%) indicated, "climate change litigation is not a likely concern for our company," including respondents representing heavy emitting industry.

A majority (62.1%) indicated, "climate change litigation is not a likely concern for our company," including respondents representing heavy emitting industry (five oil and gas firms among them). Nearly one quarter (24.2%) indicated, "We retain and manage this liability risk." The smallest number, 13.6%, indicated, "We attempt to spread this risk among our insurance providers."

Insurance Coverage

The next four questions focused on possible insurance products that risk managers might need to address climate risk.

Respondents were asked to indicate the possible need for:

- Physical asset insurance coverages and risk consultation services;
- Liability coverages including Directors and Officers insurance and tort liability extensions related to greenhouse gas emissions claims or suits;
- Specialty coverages for investments in "offsets" or other carbon credits; and
- Specialty coverages for climate change-related investments in new fuels or technologies.

Physical Asset Insurance Coverage and Risk Consultation (Q6)

Respondents were invited to "select any and all that apply" among:

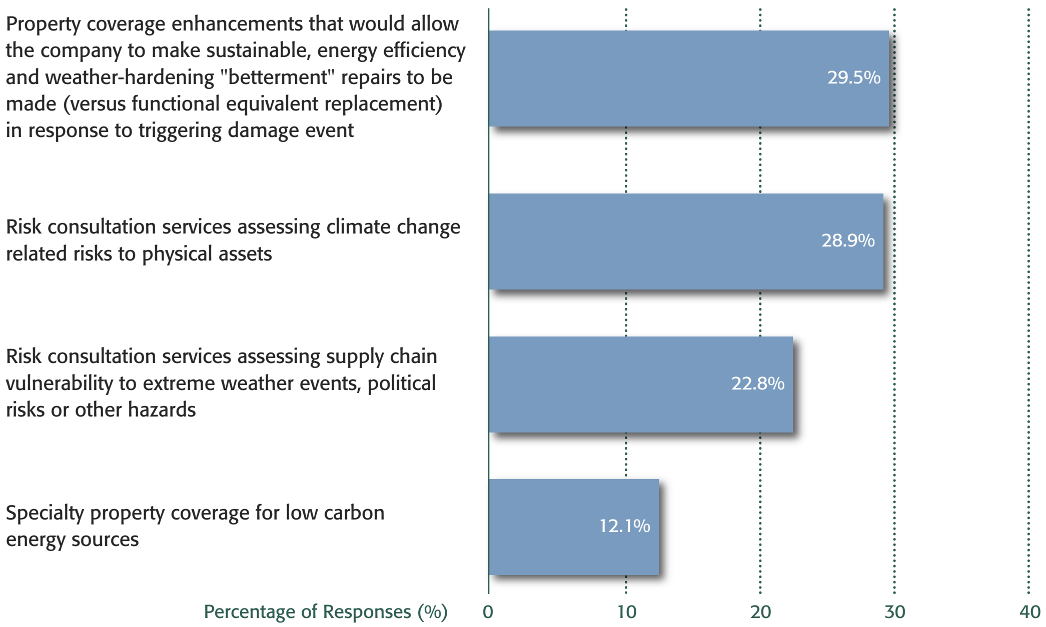
- Property coverage enhancements for energy efficiency or weather hardening "betterment" repairs;
- Risk consultation services to assess supply chain vulnerability or climate change-related risks to physical assets; and
- Specialty property coverage for low carbon energy sources.

Nearly half the respondents (43%) reported that "We do not expect to be affected by climate-related physical risks."

Of those who did expect a need for coverage extensions or risk management services:

- 29.5% indicated a potential interest in property coverage enhancements for "betterment" repairs (in response to energy efficiency or weather hardening needs);
- 28.9% indicated a potential interest in risk consultation services to assess physical asset risks; and
- 22.8% indicated a potential interest in risk consultation services to assess supply chain risks.

Interest in Specialized Property Coverage and Risk Consultation Services



Liability Insurance Needs (Q7)

Respondents were asked to indicate their potential need for four specialized forms of coverage they might consider to be beneficial in managing liability risk:

- Directors and Officers coverage for greenhouse gas emissions mismanagement or other climate-change related liability claims;
- Liability related to greenhouse gas emissions measurement and verification (carbon footprinting), and for obligations to purchase carbon credits;
- Indemnity or reimbursement for tort liability arising out of or related to greenhouse gas emissions or any other climate change-related activity; and
- Defense coverage for greenhouse gas emission or climate change-related tort claims.

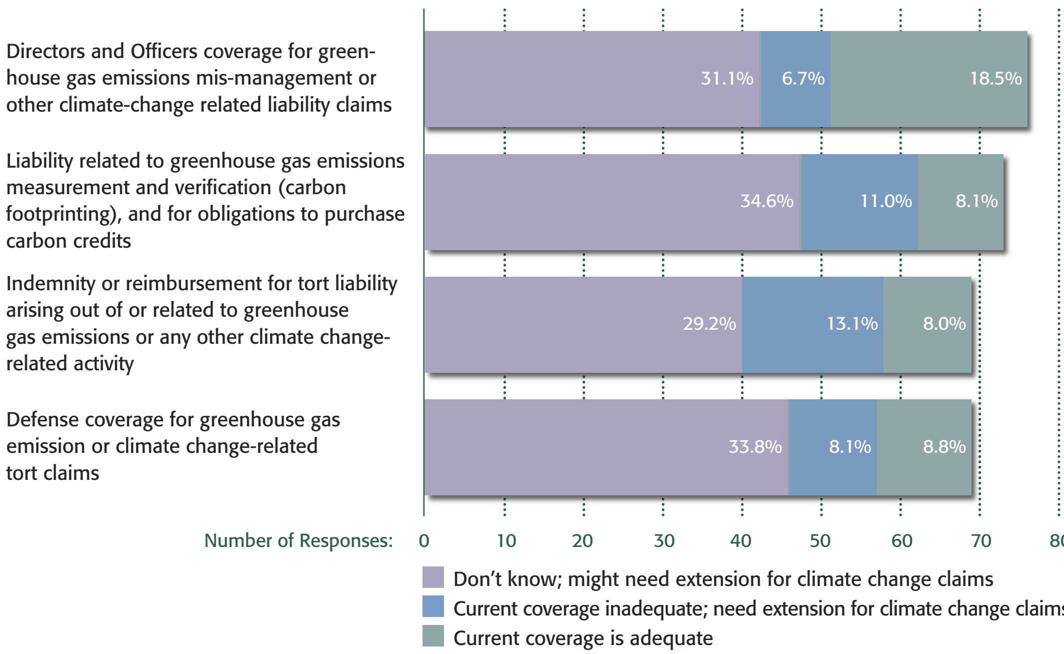
Again, nearly half the respondents, from 43.7% to 49.3%, responded that climate change liability and these related forms of coverage were "not an issue for our company."

Around a third of respondents were unsure of whether their current liability coverage was sufficient for all forms of liability surveyed.

Less than 10% of respondents reported that their current coverage was adequate for all liability risks surveyed, with the exception of Directors and Officers coverage, for which 18% of respondents felt they had sufficient coverage. A slim minority (6.7%) felt they were sure they needed a climate extension for D&O coverage, while around 10% of respondents were sure they needed a climate extension for other forms of liability coverage surveyed.

Around a third of respondents were unsure of whether their current liability coverage was sufficient for all forms of liability surveyed.

Perceived Adequacy of Liability Coverage



A Closer Look

Specific Climate Risk Concern and Need for Enhanced Insurance Coverage or Risk Consultation

Further analysis shows that higher levels of concern about particular climate risks seemed to correspond with higher interest in coverage related to that risk.

- ***Regulatory and competitive risk considered "very likely" corresponds to concerns about liability***

  Just 3.4% of those who thought regulatory risk "very likely" indicated that current coverage for liability related to greenhouse gas emissions was adequate, while 62.1% indicated they might need an extension covering these liabilities. Around half the group (50% - 53.3%) indicated interest in indemnity for tort liability or defense coverage for tort claims.

  A relatively large segment (41.2%) of this group also indicated possible interest in risk consultation services particularly for risk consultation about risks to physical assets, while around a quarter (from 20.6% - 26.5%) indicated possible interest in property coverage enhancements for energy efficiency and other "betterment" improvements, specialty coverage for low carbon energy sources, and risk consultation services to manage supply chain risks.

  Among those concerned about competitive risk, over a third (37%) indicated interest in property coverage enhancements and risk consultation services, and a majority of this group (from 51% - 59.2%) indicated interest in all forms of liability coverage.

- ***Physical risk considered "very likely" corresponds to concerns about property protection***

  Around half of those who were concerned with physical risk indicated interest in further protection of physical assets, specifically risk consultation on risks to physical assets (46.7%), property coverage enhancements for energy efficiency and other "betterment" improvements (50%), and/or risk consultation services assessing supply chain vulnerability to extreme weather events and other hazards (40%).

  Strong numbers of this group (from 38.5% - 48%) also indicated possible interest in extensions for all four types of liability coverage.

- ***Legal risk considered "very likely" corresponds to concerns about defense coverage***

  Similar to those concerned with regulatory risk, an especially low percentage of these respondents (3.7%) indicated that current coverage for liability related to greenhouse gas emissions was adequate, while 37% - 44% indicated interest in all four categories of possible liability coverage.

Insuring Climate Change Related Investments (Q8 and Q9)

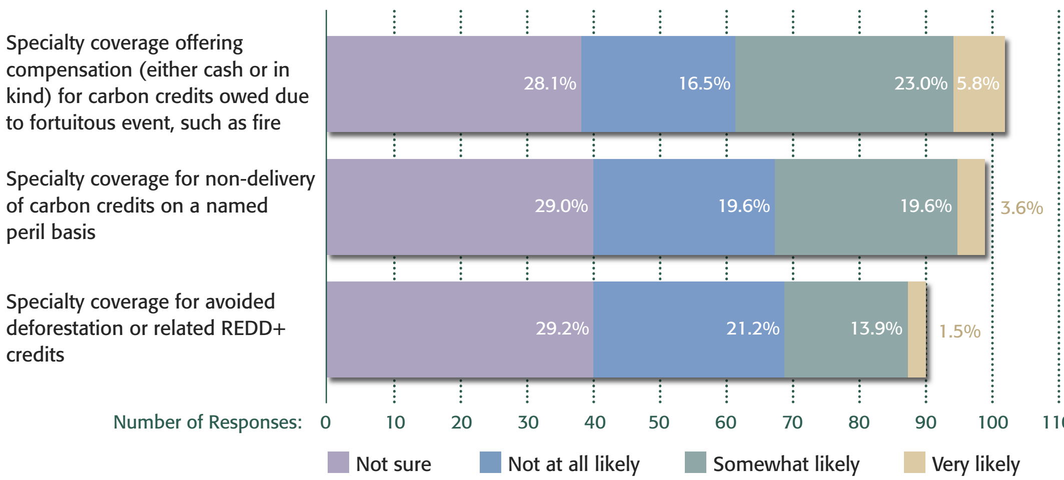
Offsets or Carbon Credits

In the first question, respondents were asked about the need for insurance coverage for the purchase of carbon credits or offsets from specific projects, such as avoided deforestation of rainforests, to comply with future regulation. *(Responses were requested for each type of carbon credit.)*

- Nearly a third of respondents (from 28.1% to 29.2%) were "not sure" about the need for these products, and another third of respondents (from 26.6% to 34.3%) thought it "not an issue for our company" – creating a sizeable majority who did not anticipate the need for such insurance products.
- Very small percentages (from 1.5% to 5.8%) anticipated a need for such insurance products as "very likely," with 13.9% – 23% of respondents indicating the need as "somewhat likely."
- Those who answered "not sure" on those three represented various industry sectors, including heavy emitters and agriculture, financial services, and insurance – all sectors that may participate in the purchase or generation of offsets or other carbon credit products.

Perceived Need for Carbon Credit/Offset Coverage

If your company were required by law to purchase "carbon credits" or "offsets" to mitigate the effects of the company's carbon emissions, to what extent do you think that specialized forms of insurance such as the following might be beneficial?

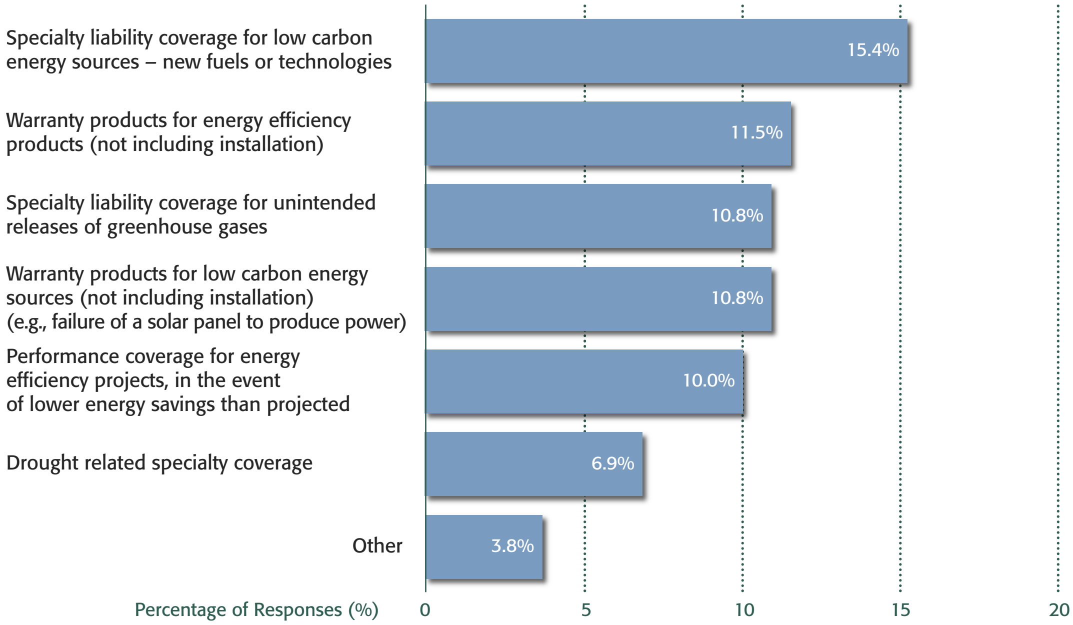


Low Carbon Energy Sources, Energy Efficiency Products

Respondents were asked about the need for specialty liability coverage and warranty products for a range of activities, including new investments, such as low carbon energy sources, and liability coverage for activities that could present performance failures, such as energy efficiency projects and products. *(Respondents were invited to "select any and all that apply.")*

Perceived Need for Specialized Liability Coverage

In response to climate regulations and/or changing customer demand, some companies are planning to offer new products or to use new fuels or technologies. If your company is considering such measures, would it benefit from any of the following types of liability coverage?



A nearly two-thirds majority (66.2%) indicated, "We are not considering such measures." Responses to other options, insurance products such as "specialty coverage" or "warranty products" for low carbon energy sources, received responses ranging from 6.9% (drought-related specialty coverage) to 15.4% (specialty liability coverage for low carbon energy sources), with most hovering around ten percent.

Discussion

Overall, the survey responses indicated moderate to strong awareness of climate risks among corporate risk managers. This conclusion seems reasonable even given the survey's relatively small sample size and diverse industry representation. The survey results also indicated some interest in further exploring emerging climate risk management issues and strategies for coping with aspects of climate risk in a number of major industries.

Top Findings

- **The majority of corporate risk managers are aware of and concerned about at least some aspect of climate risk.**
  - Regulatory risk and its potential costs are of highest concern.
  - Concern about nearer-term physical risks of climate change is stronger than anticipated.

- **Climate risk management strategies are uneven.**
  - Climate risk is managed at senior levels in some companies, and by no one in others.

- **Climate risk management products and services are unclear**
  - Risk managers are not sure whether liability coverage is adequate within existing insurance products – or may be unsure what exact liabilities will be realized as a result of climate change.
  - Insurance products and risk consultation services may not be adequate, and more communication between insurers, risk advisors and risk managers are needed to understand where extensions may be necessary.

These and other findings are discussed in more detail below.

Climate Risk

Risk managers are aware of and concerned about climate risk.

Risk managers from most of the industries surveyed indicated awareness of and concern about at least some form of climate risk – and in many cases, more than one of the climate risk categories: regulatory, competitive, physical, legal, and reputational.

The regulatory environment is a top concern for risk managers.

The risk managers surveyed are clearly most concerned about the regulatory environment – both in general and when asked specifically about climate risks – and regulation's potential direct costs.

While "climate regulation" came just under the top five responses to the question of risk managers' deepest concerns, four of the top five general risk concerns could be influenced by or related to climate regulation or the physical effects of climate change. The "political/regulatory environment," "regulatory liability," and "fuel/ power availability and price" risk concerns could all be affected by carbon pollution regulation.

These responses, combined with the fact that "climate change regulation" was the seventh rated response, seem to indicate that either now or in the near future, risks associated with climate change regulation and impacts could factor more greatly into risk management considerations and decisions.

Other risk concerns that drew responses included events in the "natural disaster" category, such as fire and flood, which could be exacerbated in their frequency and/or severity by climate change itself.

Predictably, the highest concern over climate regulation came from risk managers within industry sectors most likely to be directly regulated for greenhouse gas emissions as well as those who finance or insure those industry sectors.

Risk managers who did not expect their firms to be affected by regulation nonetheless responded that climate regulation was imminent – further reflecting general awareness of the climate regulatory environment. Additionally, virtually all risk managers – even those who did not anticipate their firms to be directly affected by regulatory risk – perceived that climate change would pose a competitive risk to their business. The high proportion of respondents who viewed climate change as posing an imminent or near-term competitive risk may be driven by the perception that higher energy prices will result from regulatory action.

Concern about nearer-term physical risk was stronger than expected.
Interestingly, physical risk concerns – those associated with climate change itself, not simply the policy/regulatory environment – were not far behind concern about the regulatory environment. Respondents indicated concern that the physical effects of climate change could affect business by compromising their physical assets, disrupting supply chains or raising the costs of commodities such as water.

Despite recent media attention to climate-change skeptics, more than a third of respondents expected that the physical effects of climate change would affect their firms in 2-10 years' time. This represents nearly the same number of respondents who expected that physical impacts of climate change would become a relevant business concern in ten or more years. This near-term perception of physical climate risk was an unexpected result.

This perception arose both in high-emitting industry, which might be presumed to be more concerned about regulatory risk and its costs (and more muted about physical risks), and in non-high emitting industry, including financial services and insurance. A high proportion of responses indicating that risk was "imminent," "very likely" or "somewhat likely" came from heavy-emitting industries.

Climate Risk Management

As risk managers are responsible for retaining appropriate insurance coverage to limit the potential for internalized losses, how these individuals plan to manage climate-related risks is of relevance to top management, internal counsel, governance directors and to the insurance industry, which seeks to profitably accept their clients' risks. Whether clients intend to hold the risk on their balance sheet, pass at least some of it through to consumers through changed pricing, or increase insurance coverage has implications for the insurer-client relationship, especially if insurers are to dedicate resources to develop novel coverage for new technologies or risk exposures.

Understanding the inconsistencies and confusion arising in this emerging arena will help risk managers and their insurers better focus on the adequacy of existing products and strategies, and where improvements need to be made.

While a quarter of respondents indicated "no one" is responsible for managing climate risk, many risk managers reported that oversight of climate risk management is handled at senior levels within companies.

Climate risk management strategies were uneven, but in many companies appeared to have been elevated to companies' top ranks. Many respondents indicated that "sustainability" or "environment" departments were responsible for tracking and managing climate risk. Yet many also reported elevation of climate risk management to senior management, board of directors, enterprise risk management or risk management divisions. This response indicates that climate risk is regarded as a concern that merits broader management and engagement of other departments within firms.

Climate risk management strategies appear to be nascent.

Given the diversity of effects that legislation would have on various industries, it is not surprising that firms would respond to climate legislation in a variety of ways. Among those who responded that their firm would take action in some way, many described that response as some combination of passing through costs to consumers, evaluating insurance coverage to transfer the risk where possible, and retooling products to take advantage of subsidies or avoid liabilities. However, the diversity of approaches to managing and governing risk reported by firms even within the same industry seems to reflect that many firms are still at an early stage of developing their climate risk management strategy.

The form of climate risk that is perceived by risk managers can shape their interest in insurance coverage types; however, many risk managers are unsure of how insurance coverage will fit into a broader climate risk management strategy.

Many of those who reported a high likelihood of organizational exposure to climate risks also expressed potential interest in new coverage or extended insurance coverage to guard against related risks. Risk managers anticipating physical risks were also likely to be interested in considering extended coverage for physical assets or risk consultation services for supply chain and operations. Those concerned with regulatory and/or legal risk also perceived some current liability coverage as inadequate and expressed potential interest in liability product extensions.

This finding further indicates that some risk managers view a) some climate change risks as being insurable and b) insurance as a potential tool for managing climate risk. These are promising findings for the insurance industry, as in recent years insurers have invested more resources into the development of climate-related coverage.

Where risk managers expressed an uncertainty in the need for extensions or a disinterest in specialty coverage may be due to their recognition of a complex and changing risk environment or may indicate a need for more discussion with brokers or insurance providers.

One of the more striking examples of the unevenness of responses on insurance-related questions emerged when examining the responses to questions on specialty coverage and extensions from those who found regulatory or legal risk to be very or somewhat likely in the near term. Just over 3% of those who reported legal or regulatory risk to be very or somewhat likely judged their existing Directors and Officers liability coverage to be adequate. Those respondents were also more likely to express interest in potential insurance extensions for tort liability and greenhouse gas emissions reporting verification. Yet risk managers expressed a high degree of uncertainty or very little need for specialty coverage for carbon credits and offsets, two mechanisms that will almost definitely be used by regulated firms.

These types of inconsistencies suggest more work needs to be done by the insurance industry and by risk managers in understanding and clarifying where current insurance products will and will not cover these new liabilities. These responses also indicate that until there is greater clarity in the regulatory environment, risk managers may not know how insurance will play a role in managing regulatory risk.

High legal risk perception is not matched by certainty of liability coverage, indicating an important gap that must be addressed.

One of the most notable findings was the large proportion of respondents who expressed uncertainty over whether present coverage was sufficient to mitigate liability for climate-related claims. Such liabilities could take the form of claims against directors and officers, liability related to greenhouse gas reporting or carbon credit delivery, or indemnity/reimbursement and defense costs for emissions-related suits.

In particular, defense costs for tort liability are already being borne by some large emitters from the energy sector and their insurers. A number of cases proceeding through various circuit courts have advanced well beyond the early expectations of observers[7]. Such litigation can pose extraordinary defense costs, and one insurer has already filed suit against one of its insureds, seeking to be relieved of coverage obligations arising from a lawsuit against major energy producers *(Steadfast Insurance Company v. The AES Corporation)*[8].

That so many survey respondents indicated uncertainty in how existing insurance coverage would play a role in managing the risks of tort liability may reflect a close attention to these legal developments.

Lower total responses to risk management questions may also reflect uncertainty.

The number of respondents dropped from 175 to approximately 136 for the four questions about the need for specific products and/or risk consultation services. The number of respondents who were unsure of how their firm would respond, or who limited their response to the somewhat generic "Our company would pay more attention to climate risks" may in part explain the lower number of responses to these questions (see Survey Details for more detail on declining response rate across the survey).

As insurance is just one piece of overall risk management, those firms that do not have a plan for responding to climate legislation or policies are unlikely to have considered how risk transfer products might assist them in managing risks brought by political action.

7 For a synopsis of greenhouse gas tort liability litigation, see Munich Re 2010.

8 See http://www.climateandinsurance.org/takefive/bio_Hajost.htm

Conclusion and Recommendations

The survey is a first step in helping risk managers, capital providers, and insurers to better understand climate risk perception and what role internal risk management and external risk transfer such as insurance can play in mitigating such risks. The variety of risk management practices and uncertainty of insurance adequacy captured in this survey may be appropriate given the rapid evolution of climate risk. More in-depth (and perhaps one-on-one) exploration of potential liabilities and adequacy of current insurance coverage might be helpful for insurers, clients, and even for financial services firms that invest in these ventures.

Risk managers, risk advisors and members of the insurance industry should take the following steps to understand what these evolving risks mean for their business:

Risk Managers

- ☐ Tap into emerging expertise on evolving climate risks to understand your organization's possible exposure. When necessary, seek outside expertise on specific risks. A growing number of risk advisors and law firms offer free seminars on emerging climate risk, widening the pool of expertise beyond fee-for-service consultation. Smaller organizations may want to engage risk management societies or trade associations to gain access to expertise on risks that are highly uncertain and may have industry-wide implications.

- ☐ Communicate to senior management, operations, procurement, facilities planning, legal counsel and other critical decision makers your organization's potential exposure to climate risk, even when such risk is highly uncertain and evolving. Help them find the resources they need to build climate risk into their decision-making processes, from power purchase agreements to facilities siting to financial disclosure.

- ☐ Consider whether the management structures and performance metrics in your organization are adequate for managing emerging climate risks, or whether new organizational practices or structures may be necessary.

- ☐ Evaluate your present insurance coverage in light of emerging climate risks. Talk to your insurance brokers, insurance carriers and risk advisors about your possible exposure and what advisory services or products may be available to help your organization manage these risks. When necessary, engage general counsel in discussions of what recent legal developments may mean for the adequacy of present insurance coverage.

Insurers & Insurance Brokers

- ☐ Talk to your insureds about climate risks. While insurers may find market value by innovating climate products and insureds may benefit from insuring emerging climate risks, both sides of the market will need to invest in market formation before these practices become standard and products become readily available.

- Insurance brokers may also play an important role in helping their clients to understand potential climate-related risk exposures from historical activities, compliance with emerging regulation or investments in new technologies. As no single insurer offers all of the products described in the survey, brokers may be the best positioned to help risk managers understand emerging risk and current risk transfer products available in the marketplace and to communicate unmet needs to insurers interested in innovating new products to meet changing customer demand.

- Greater research into climate risk perception and management can ensure that risk management practices keep pace with evolving risks and illuminate what role insurance should play in the management of climate change risk. Future surveys of risk managers should endeavor to capture more responses from non-financial sectors in order to better understand how risk perception varies by sector affiliation or annual revenue, what education risk managers have been offered by their insurers or insurance brokers on climate risk, and how the division of risk management within the organization correlates to demand for insurance coverage enhancements.

Survey Details

Survey responses declined by section of the survey, as shown in the following response rates:

- "Top five risk concerns" (1 question): 202 responses
- "Climate change risk" (2 questions): 175 responses
- "Climate change risk management" (2 questions) 159 – 158 responses
- "Insurance products to manage climate risk" (5 questions) 149 – 130 responses

Text of Risk Manager Survey

Climate Change Risk Management Survey

You have been invited to participate in a PRMIA Survey.

The survey is designed to provide a valuable indication of how risk managers across different U.S. industry sectors are dealing with issues of energy and climate change. The results of this study will be compiled and published in a report that will be made available to you upon its completion.

It will take approximately 10 minutes to complete the survey and the responses are strictly confidential.

Thank you in advance for your support. Please start with the survey now by clicking on the Next button below.

This survey is designed, implemented and administered by Ceres and sponsored by Zurich.

1. Of the following issues that may pose business risks to your company, **please indicate the five (5) risks that you are most concerned about**.

- [ ] Water availability & quality
- [ ] Political / regulatory environment
- [ ] Transportation
- [ ] Board of Directors composition
- [ ] IT systems & security
- [ ] Financial regulation
- [ ] Credit availability
- [ ] Fuel / power availability & price
- [ ] Intellectual property management
- [ ] Natural disaster
- [ ] Pandemic
- [ ] Supply chain disruption
- [ ] Interest rate / currency risk
- [ ] Physical impacts of climate change
- [ ] Employee recruitment & retention
- [ ] Climate change regulation
- [ ] Regulatory liability

2. Climate change, or global warming, is considered to pose at least some business risk to industries, due to either emissions regulation, tort liability, civil liability or the physical impacts of a changing climate.

Which of the following risks may be associated with your company?

	Very likely	Somewhat likely	Not at all likely	Not sure
Regulatory Risk: Greenhouse gas emission regulation, domestic or international				
Physical Risk: Impacts such as reduced water supplies, storm pattern changes, more variable seasonal weather; droughts; permafrost melt; fewer freeze days to kill off agricultural pests; pandemic; or other physical threats to your operations or supply chain				
Competitive Risk: Increased energy prices for operations, changes in demand for products / services in response to climate regulation or physical impacts on consumers				
Legal Risk: Any risk of tort liability, civil liability, fines / penalties, or other litigation				
Reputational Risk: Any risk of negative publicity regarding business practices, due to heightened attention to climate change				

3. For each of the types of risks defined above (Regulatory, Physical, Competitive, Legal, Reputational):

In what timeframe do you believe those risks will become relevant to your company?

	Current (0-2 years)	Near term (2-10 years)	Long term (10 or more years)	Not likely to pose a risk in any timeframe
Regulatory risk				
Physical risk				
Competitive risk				
Legal risk				
Reputational risk				

4. If government takes action, such as implementation of cap and trade, taxes or subsidies (e.g., grants, loans, loan guarantees), to reduce greenhouse gas emissions, **in what way would passage of such legislation or rulemaking most likely affect your risk management?**

Select any and all that apply.

- [ ] Our company would pay more attention to climate risks
- [ ] Our company would assess our insurance coverage
- [ ] Our company would change some pricing to compensate for increased risk
- [ ] Our company would change some products in response to increased risk (liability) or opportunity (subsidy)
- [ ] It would not affect our company
- [ ] Not sure
- [ ] Other (please specify)

5. Does your company have a process in place to assess these risks and opportunities associated with climate change? **If so, please indicate who within the organization is responsible for interpreting, managing or communicating climate change risk.**

- No one is assigned this responsibility
- Board of directors
- Senior management
- General counsel
- Risk management division
- Product development / R&D
- Facilities planning
- Marketing
- Sustainability department
- Enterprise risk management team
- Other cross-organizational team (please indicate which departments are involved below)
- Not sure
- Other (please specify)

6. If your company or supply chain is vulnerable to climate-related physical risks (see description below), **which of the following specialized forms of insurance would you consider to be beneficial?**

(Physical risks include impacts such as: reduced water supplies, storm pattern changes, more variable seasonal weather; droughts; permafrost melt; fewer freeze days to kill off agricultural pests; pandemic; or other physical threats to your operations or supply chain.)

Select any and all that apply.

- Property coverage enhancements that would allow the company to make sustainable, energy efficiency and weather-hardening "betterment" repairs to be made (versus functional equivalent replacement) in response to triggering damage event
- Specialty property coverage for low carbon energy sources
- Risk consultation services assessing supply chain vulnerability to extreme weather events, political risks or other hazards
- Risk consultation services assessing climate change related risks to physical assets
- We do not expect to be affected by climate-related physical risks

7. Companies already carry various types of liability coverage. **In your opinion, to what extent do the following types of liability insurance currently assist your company in managing risk related to the impacts and/or regulation of climate change?**

	Current coverage is adequate	Current coverage inadequate; need extension for climate change claims	Don't know; might need extension for climate change claims	Not an issue for our company
Directors and Officers coverage for greenhouse gas emissions mis-management or other climate-change related liability claims				
Liability related to greenhouse gas emissions measurement and verification (carbon footprinting), and for obligations to purchase carbon credits				
Indemnity or reimbursement for tort liability arising out of or related to greenhouse gas emissions or any other climate change-related activity				
Defense coverage for greenhouse gas emission or climate change-related tort claims				

8. If your company were required by law to purchase "carbon credits" or "offsets" to mitigate the effects of the company's carbon emissions, **to what extent do you think that specialized forms of insurance such as the following might be beneficial?**

(A REDD+ carbon credit is a carbon market mechanism created to reduce emissions from deforestation and forest degradation in developing countries.)

	Very likely	Somewhat likely	Not at all likely	Not an issue for our company	Not sure
Specialty coverage offering compensation (either cash or in kind) for carbon credits owed due to fortuitous event, such as fire					
Specialty coverage for non-delivery of carbon credits on a named peril basis					
Specialty coverage for avoided deforestation or related REDD+ credits					

9. In response to climate regulations and/or changing customer demand, some companies are planning to offer new products or to use new fuels or technologies.

If your company is considering such measures, would it benefit from any of the following types of liability coverage?

Select any and all that apply.

- Specialty liability coverage for low carbon energy sources – new fuels or technologies
- Specialty liability coverage for unintended releases of greenhouse gases
- Warranty products for low carbon energy sources (not including installation) (e.g., failure of a solar panel to produce power)
- Warranty products for energy efficiency products (not including installation)
- Performance coverage for energy efficiency projects, in the event of lower energy savings than projected
- Drought related specialty coverage
- We are not considering such measures
- Other (please specify)

10. With respect to third party tort liability, **which of the following best describes your company's approach to any potential litigation over climate change?**

- We retain and manage this liability risk
- We attempt to spread this risk among our insurance providers
- Climate change litigation is not a likely concern for our company.

11. **Approximately what were your organization's total revenues in 2009?** Your best estimate is fine.

- Under $5 million
- $5 million to $50 million
- $50 million to $500 million
- $500 million to $1 billion
- Over $1 billion
- Not sure

12. **Please indicate the industry(ies) your company/organization represents.**

Select any and all that apply.

- Agriculture - crop
- Agriculture - livestock
- Power - electric
- Power - natural gas
- Power - coal
- Public utility - power
- Public utility - water
- Mining
- Oil and gas extraction / refining
- Manufacturing - cement
- Manufacturing - industrial gas
- Manufacturing - chemical / petro chemicals
- Manufacturing - automobile
- Manufacturing - motor / engine
- Manufacturing - appliance / "white" goods
- Recycling
- Waste management
- Environmental engineering
- Other (please specify)
- Engineering
- Health - biotechnology
- Health - medical
- Software solutions / services
- Consumer electronics
- Tourism / entertainment
- Government - state
- Government - municipal
- Government - non-regulatory
- Real estate management / development / construction
- Financial services
- Accounting / auditing
- Insurance
- Commodies trading (non-energy)
- Executive recruiting
- Corporate (non-financial)
- Academic (faculty)

13. **Please indicate the geographic scope of operations of your company/organization.**

- Domestic (U.S.)
- Foreign (outside U.S.)
- Multinational

14. **Please indicate your main role in your company/organization.**

- Legal
- Finance
- Risk management
- Other (please specify)

15. If you believe that your company might benefit from specialty liability risk management solutions, including insurance products and services designed to address climate change-related risks, **would you be willing to participate in specific product / service development discussions with Zurich?**

- Yes
- No
- Our company has no need for such products

16. If you answered "yes" above, **please provide your contact information.**

Name:

Company:

Address 1:

Address 2:

City/Town:

State/Province:

ZIP/Postal Code:

Country:

Email Address:

Phone Number:

Thank you for participating. Your response will allow us to provide valuable feedback to PRMIA membership about issues of climate change risk.

Ceres

Ceres
99 Chauncy Street
Boston, MA 02111
T: 617-247-0700
F: 617-267-5400

www.ceres.org